MANAGEMENT TV AT AIR FORCE SYSTEMS COMMAND

Closed Circuit Color Television Network Provides Instant Information For Critical Management Decisions

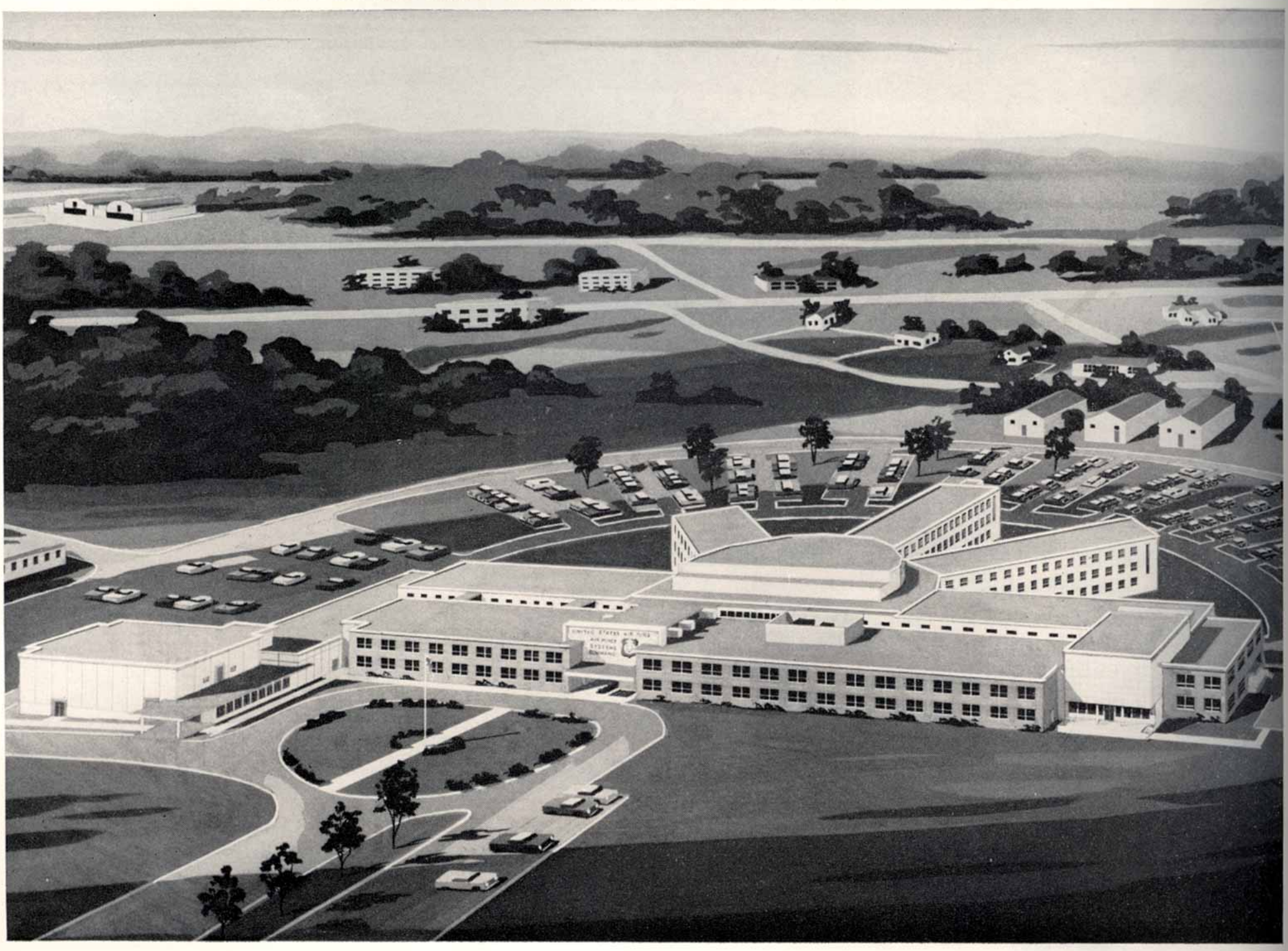
Closed circuit television is the nucleus of a comprehensive management plan conceived by the Air Force Systems Command, and personally endorsed by General B. A. Schriever, to establish a "real time" communications link between AFSC Headquarters at Andrews Air Force Base, Washington, D.C., and the Command's 13 divisions and centers throughout the country. The purpose of the link is to expedite the decision making process by presenting current information with modern television techniques and equipment.

"Real Time" Communications

Totally new in concept, the management communications plan is based on the exchange of information in *real time,* that is, the instantaneous presentation of events, audibly and visually, as they actually occur. It is virtually "conference television" but much more, since it not only combines two-way, live television with all the known visual display and storage techniques, but incorporates means to make the channels jam-proof and intercept-proof and thus "secure."

Such real-time communication will provide critical information—the moment it is needed—for instant management decisions required by the Air Force Systems Command in carrying out its responsibilities for the research, development, production,

FIG. 1. Air Force Systems Command headquarters building at Andrews Air Force Base.



procurement and check-out of complex aerospace systems among its geographically dispersed divisions, test centers and possibly principal contractors.

Information sought from such a network may be the kind needed to make timely and accurate technical judgments. Today, the future work course of a dozen of the Command's far flung offices may hang in the balance while awaiting a decision. Real-time communications is looked upon as the only solution.

Example of how real-time communications is applied:

1. An unforseen problem at Space Division in California halts evaluation of a new spacecraft re-entry technique.
2. Project commanders and officers quickly prepare charts and other visuals for briefing distant headquarters at Andrews Air Force Base via TV.
3. Headquarters personnel prepare for briefing. General Schriever assembles staff members to participate. Cameras are moved into TV conference room.
4. California is "on the air." The securely transmitted briefing is viewed by the General and his staff, is simultaneously videotaped for future use. Discussions ensue between East Coast and West Coast personnel by "live" TV. Each can see the other. Points are clarified by charts and diagrams. A decision is made.
5. A second TV conference is called. All cognizant Command divisions and centers are similarly briefed on the West Coast re-entry problem and its solution.

In only a few minutes notice, real-time communications by TV has bridged the distance gap by resolving an urgent difficulty and advising all concerned of the outcome.

FIG. 2. At Headquarters AFSC, Gen. Schriever is alerted to stand by for a briefing on the President's budget.

ADVANTAGES OF USAF TELEVISION NETWORK

Accelerated decision-making is just one advantage of the plan. Large savings are anticipated in travel and in the time people spend away from their jobs. Far reaching returns are summed up in the following comments by General Schriever:

"This real time system will provide us with much better management control throughout the command. And I think it will produce one other thing as far as the individuals in the Command are concerned, and that is a sense of participation in what goes on in our wide-spread organization. I think we will go a long way toward cementing the Command as an entity rather than a group of separate empires."

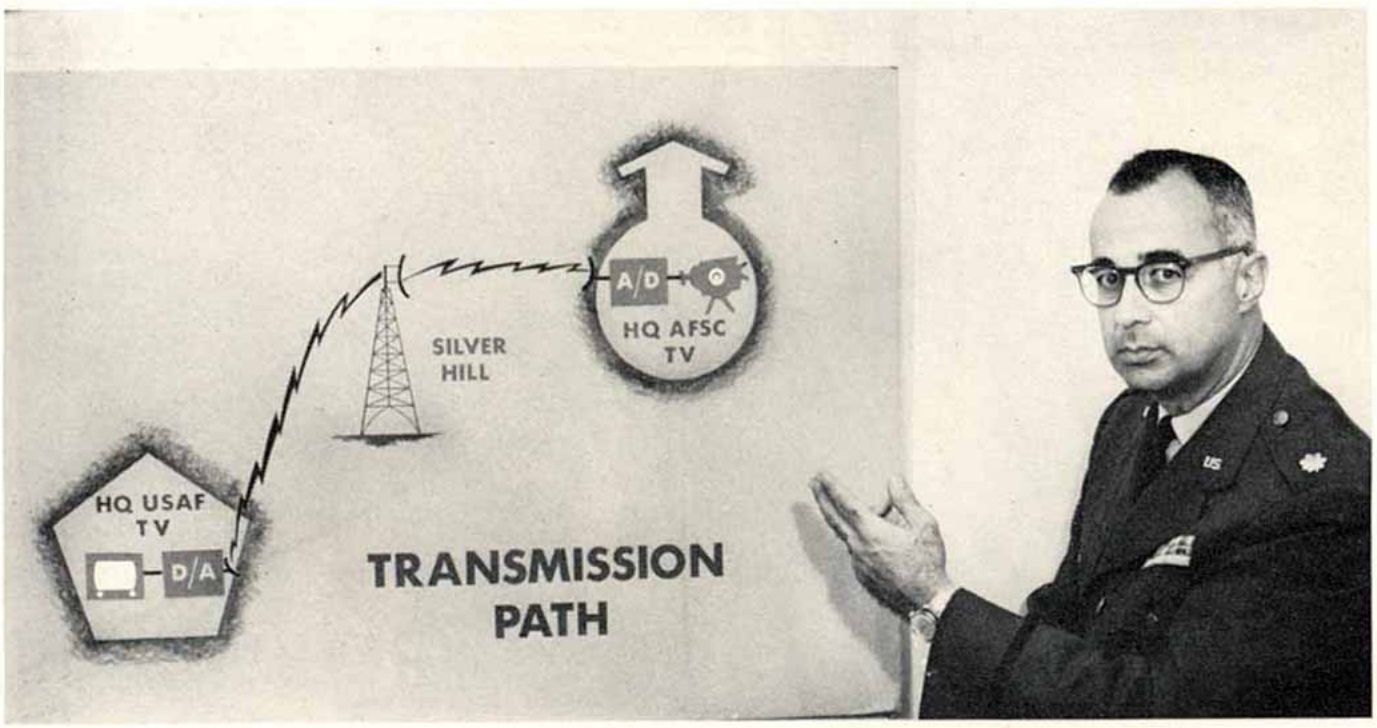


FIG. 3. Major J. F. Sublette, Telepresentations Branch, displays proposed secure microwave link to interconnect AFSC headquarters and the Pentagon.

Secure Nationwide Network

The AFSC system as visualized could ultimately provide the Air Force and other military and government agencies, including the White House, with a nationwide, secure closed circuit color TV network integrated by microwave and coaxial cable links and combining both live and video tape transmission and reception capabilities.

Tests have demonstrated the practicality of encoding and decoding video signals for security in transmission. As to the required transmission channels, it is possible they may be made available through implementation of already planned facilities such as the Defense Communication Service Automatic Digital Network (AUTODIN) or use of a communications satellite system.

Present Use of CCTV

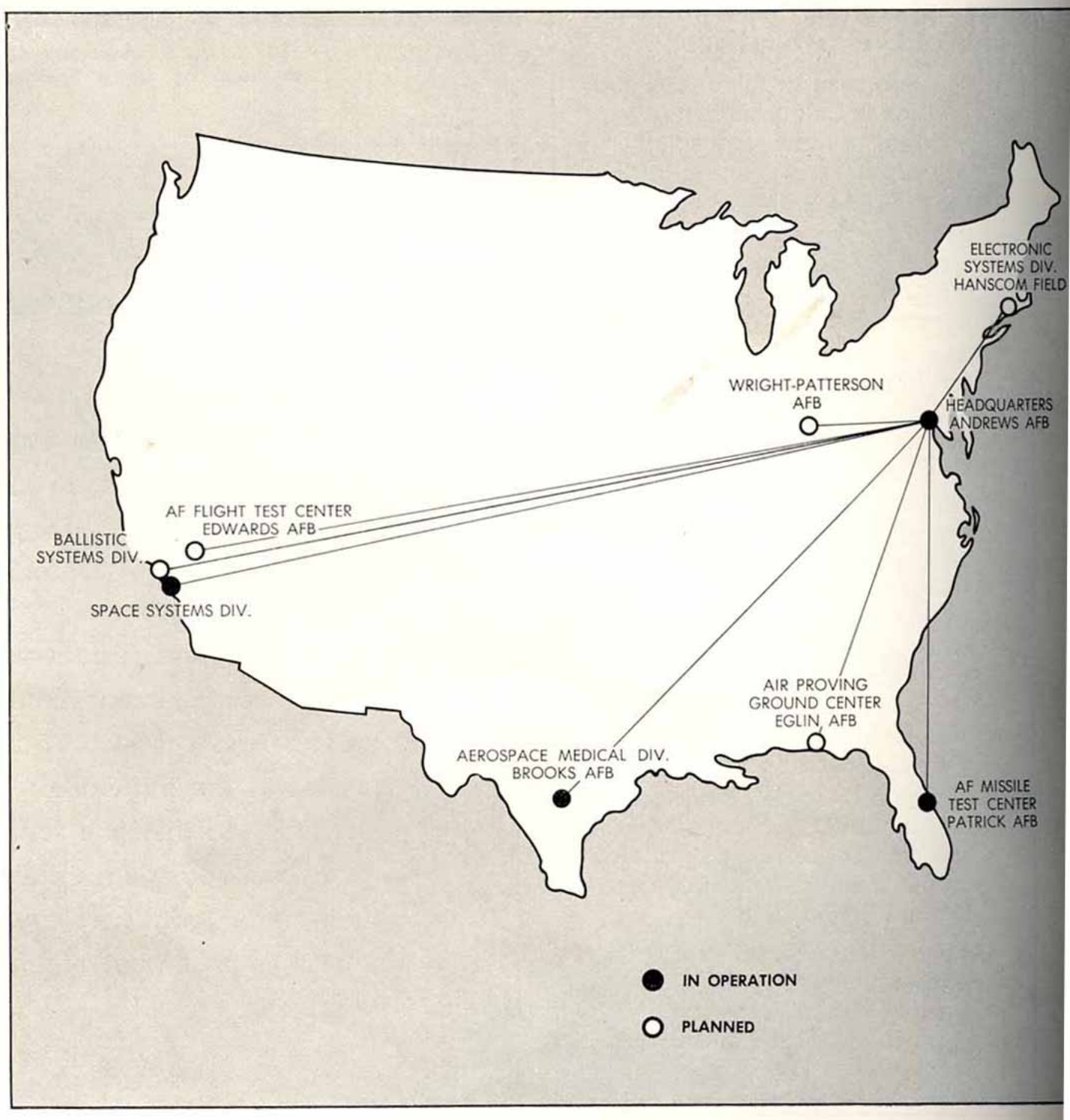
Facilities of AFSC and its development divisions and test centers are in various stages of operation, acquisition or planning. Headquarters, at Andrews AFB, as well as the Space Systems Division in California and the AF Missile Test Center at Patrick AFB, are all operational with color cameras and TV tape recorders. At Brooks AFB, the Aerospace Medical Division, which has cognizance of R & D programs in "bioastronautics," the study of life sciences and biological payloads, operates with monochrome TV but presently is being converted to color. TV systems are planned for the Ballistic Systems Division, Aeronautical Systems Division, Foreign Technology Division, Electronic Systems Division, AF Flight Test Center and the Air Proving Ground Center.

Live or taped briefings or special presentations covering up-to-the-minute advances in research and development, information on foreign technology, latest systems project data and noteworthy Department of Defense, national or world news events are displayed on viewing monitors in conference rooms and key management offices in each of the CCTV equipped divisions and centers. Key briefings are taped and forwarded to headquarters for playback on secure distribution outlets. Recordings received from other commands or contractors may be viewed, integrated with existing tapes, or recorded on tape or film for future use.

CCTV facilities are also providing System Command personnel, and when the workload permits, Office of Information personnel with production guidance and

MANAGEMENT TV NETWORK
OF AIR FORCE SYSTEMS COMMAND

FIG. 4. AFSC "Instant Communications" Network showing systems in operation, and those planned for the future.



valuable experience in the direction, recording, storage and playback of briefings.

In recent Project Forecast, which was a study of future Air Force weapons systems requirements utilizing top echelon experts in almost every field, some 50 tapes were made and disseminated to various military commands and agencies.

Distribution of tapes between the commands, divisions and centers of AFSC is made via the "pouch" system which is capable of overnight coast to coast delivery.

The Command Management Center

A report on AFSC's plans to establish at headquarters a Real Time Control facility, of which closed circuit TV is an integral part, was the subject of a TV presentation made by Lt. Col. Maynard Y. Binge, Chief of the Command Management Support Division of the AF Systems Command. In essence, the report is briefly summarized as follows:

A construction program was begun in 1961 to modernize and centralize headquarters' communication facilities. New switchboards were installed with long line interconnections to all divisions and centers. Improvements were made in data presentation and reporting capability by setting up a Real Time Control Room as the center for all teletype and telephone communications, and incorporating an Instant Management Data System to be integrated with the CCTV facility and, eventually with the Command automatic data processing system. A TV studio was constructed, conference rooms were equipped for TV viewing and for camera pickups, and the CCTV system was installed. The result was the creation of a "Command Management Center," a facility that will be ultimately geared to command-wide, real-time management communications.

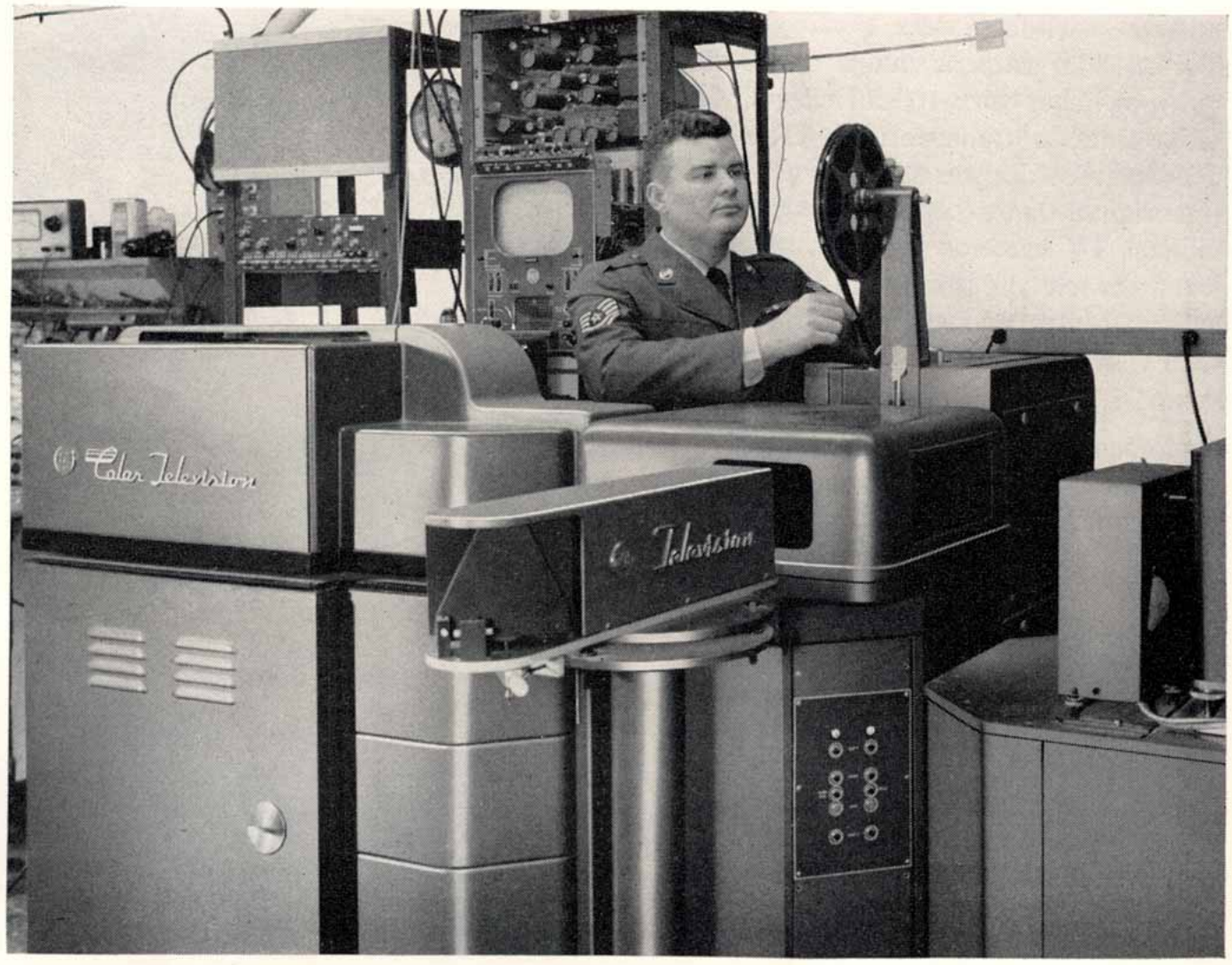


FIG. 5. Color opaque materials, color slides and 16mm film can be integrated into live presentations.

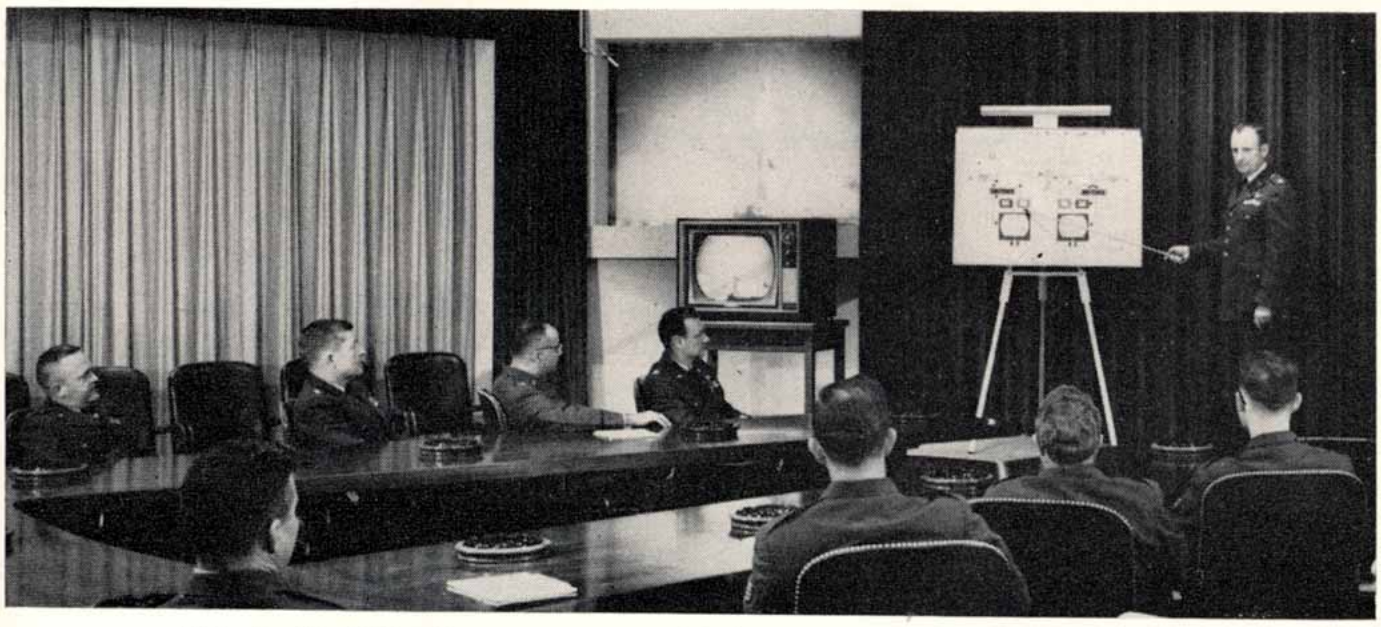


FIG. 6. Lt. Col. Binge presents a briefing in main conference room at AFSC HQ, using charts, TV tape and film inserts, and rear screen projections.

FIG. 7. Air Force staff group in briefing room views televised report on a command project from distant base.

Headquarters AFSC TV Facilities

The TV equipment originally installed at Headquarters early in 1962 was operated primarily as a monochrome system, although the equipment included a color film system and the first RCA TV tape recorder to be used for color. Major items consisted of two TK-15 studio camera chains, TK-26 color film and slide system with opaque pickup, TRT-1 TV tape recorder, TS-11 video switcher and a BC-6 dual-channel audio control console.

When, in October of 1962, results of tests had shown that color was a requirement for the system, the two monochrome cameras

and the switcher were replaced by two TK-41 color camera chains and a TS-40 video switcher with special effects. At the same time, a transistorized TR-22 color TV tape recorder was added to complement the original tape recorder. In addition, two vidicon TV cameras were set up to read from two teletype printers in the communications center and to feed data into the CCTV system.

Program lines emanating from the TV equipment rooms can simultaneously feed three different TV programs to a total of four conference viewing rooms and five offices, plus the communication room and normal TV equipment monitoring areas. Camera cables are permanently installed between the control room and two of the four conference rooms, permitting TV cameras to be rolled into conference rooms for live pickups during briefings. The main conference room is equipped with two 21-inch color TV monitors, two rear screen optical projection systems and a large screen monochrome TV projector.

In the TV control room, both video and audio input and output lines are on jack panels permitting any desired patching between signal sources and viewing rooms and offices. Other features of the system

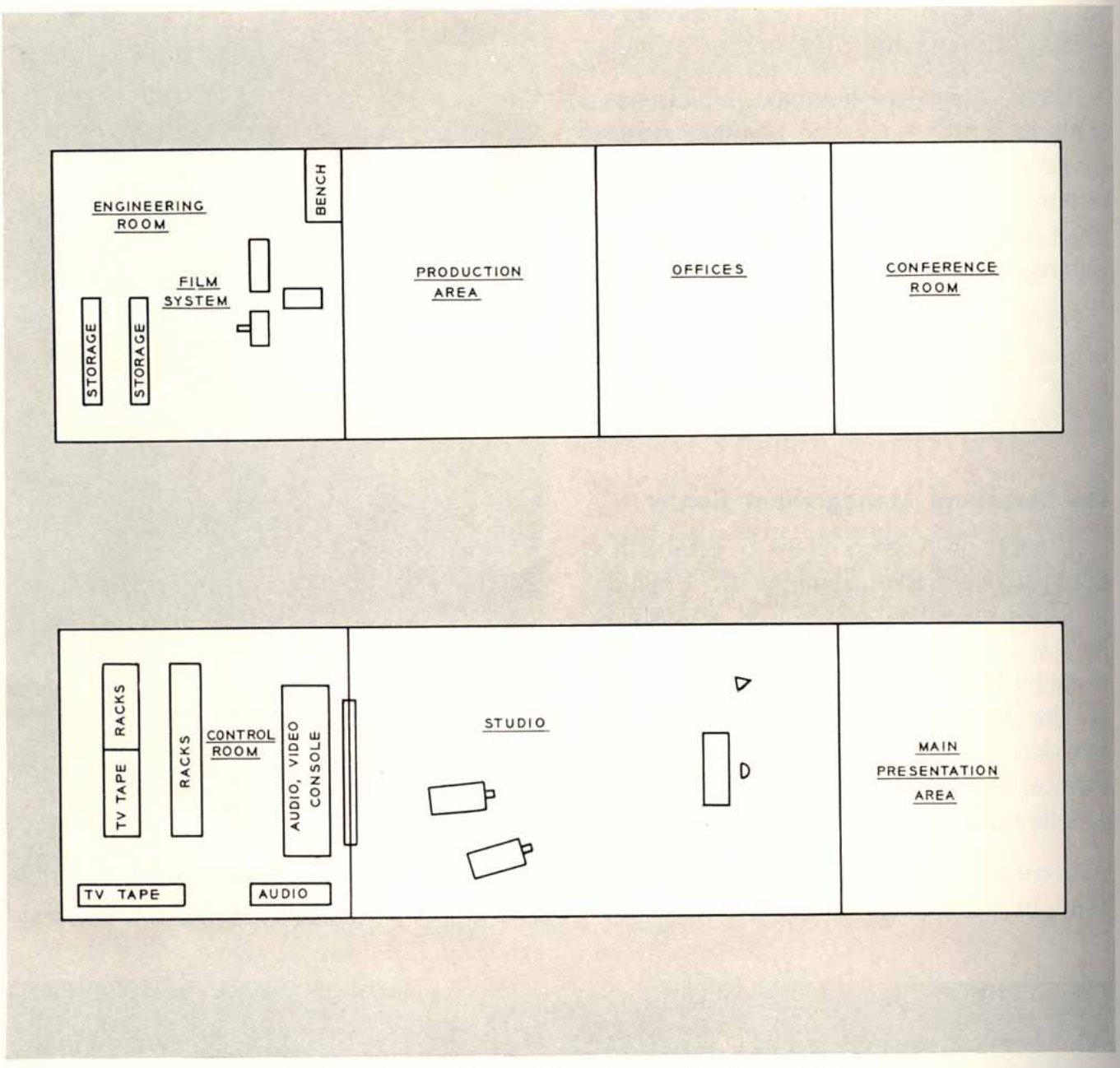
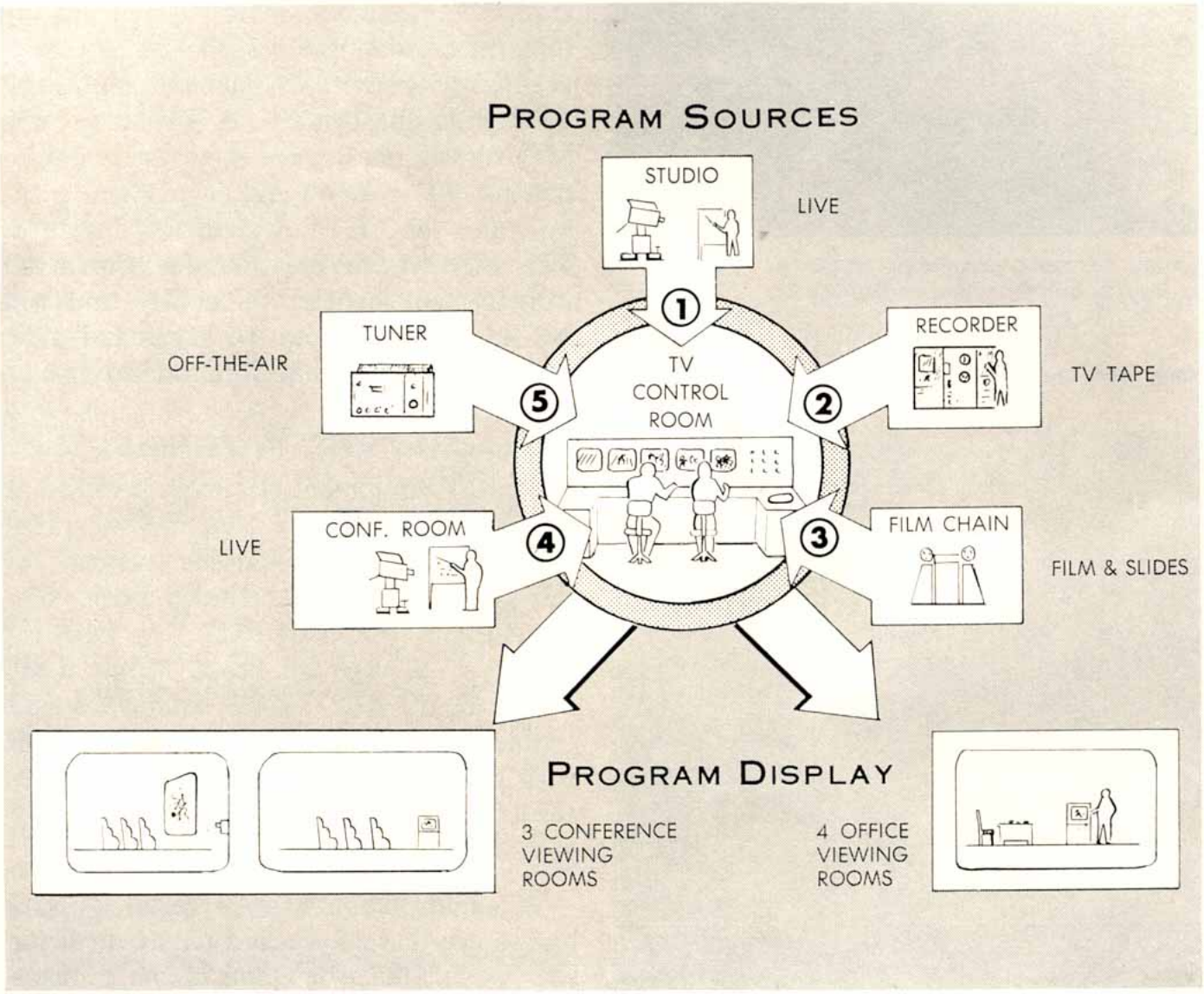


FIG. 8. Floor plan of TV system at Andrews AFB.

FIG. 9. HQ AFSC programming capabilities.



include two independent audio channels and talk-back facilities for question and answer liaison between the briefer and each viewing area. An off-air pickup tuner permits integration of commercial TV broadcasts into CCTV programs.

Production of TV Briefings

TV briefings and other special presentations are initiated and produced by CCTV-equipped divisions and centers with the help and guidance of the Telepresentations Branch at headquarters which draws additional support from the Graphics Branch of the Office of Information.

A TV production planning guide issued by Headquarters describes TV capabilities, lists available sets and properties, tells how to prepare the script and how to plan presentations, discusses the selection of visuals and the preparation of artwork and graphic materials, and lists tips to guide the performer in well-executed presentations.

Generally, there are four steps to the production of a briefing, from conception to final presentation, each of which is treated at length in the planning guide:

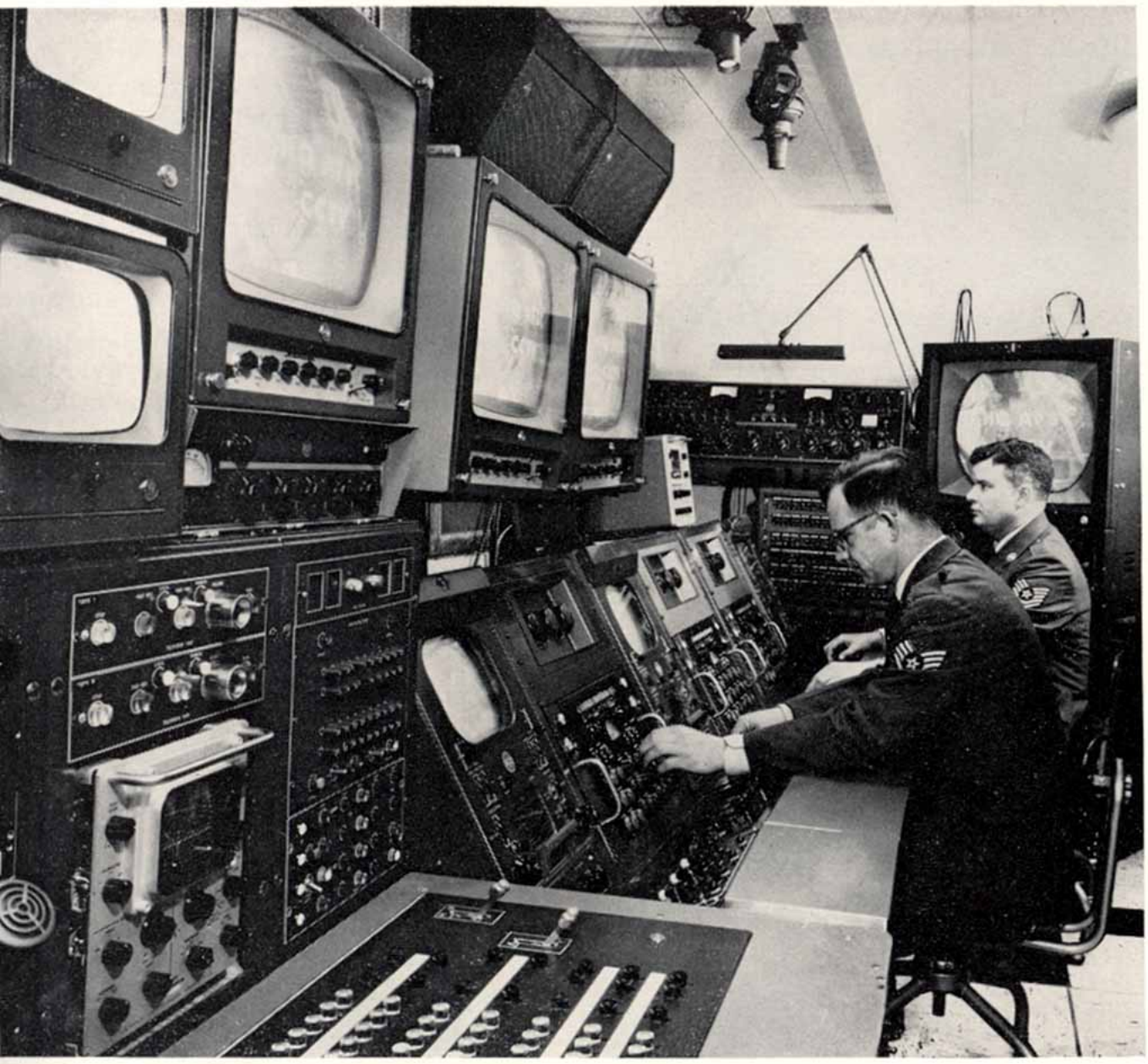


FIG. 10. Control room at Andrews for switching and control of color film and color studio cameras, and audio.

1. *Initial Script and Production Conference.* At this meeting the "briefer" presents the TV staff with an academic "action outline" containing in sequence the material he plans to cover, including statements of purpose and audience description. This meeting provides an opportunity to agree upon treatment, settings and format, scheduling of rehearsals and presentation.
2. *Visual Aids Conference.* This is set up by the production director and attended by an artist from the presentation or graphics section. The briefer presents sample charts, graphs and photos for visualization of the content material. With the action outline as a guide, the entire production is discussed, visuals are sketched and located in the outline as desired. Methods of presentation, whether on film, slides, flip cards, blackboards or special devices, are decided. This "talk through" is a major step in the creative process of production, helping the briefer to organize his commentary, and the artist to understand what his visuals should describe. The artist then begins to prepare the TV artwork.
3. *Script Conference.* With the revised action outline and a list of the visual

FIG. 11. TV switching system Type TS-40 selects program source requested in any of the conference rooms or offices. System permits special effects to be inserted.

FIG. 12. Control room equipment includes dual channel audio console Type BC-7, permitting simultaneous use of two sound channels.

EXAMPLE OF PART OF A TELEVISION PRODUCTION SCRIPT

TITLE:

CLASSIFICATION: (Unclassified)

DATE:

VIDEO	AUDIO
CU pan flannel board	These, then... the visual aids conference, the script conference, and the rehearsal are the three general areas in production planning for your telecast. Remember, no electronic device can eliminate the factor of effort from a good presentation.
MS talent walks to chalkboard	(TALENT DRIFTS BACK TO CHALKBOARD)
CUs of each chart	In the race for space there is a pressing need for up-to-the-moment management information. Television, used as a tool of management communication, holds great promise as one way of helping to meet this need. The information output of television is only as good as the input. It is a tool... as such, it is neutral; its use by you determines its value. It presents certain unique advantages (POINT TO #1 CHART) and, with them, certain inherent limitations. (CHART 2) These we have sketched for you and, in addition, outlined some of the procedures (CHART 3) you may encounter when briefing by TV.

TELEVISION SAFETY FIELD FOR 8"x10" OPAQUE

These ratios closely apply to all other material for Television projection

8" x 10" - The overall outside dimension

6 3/8" x 8 1/2" - The inside border or opaque mask opening - the extent of the prepared artwork

6" x 8" - The area scanned by the film chain TV camera

4 1/2" x 6 1/2" - Safety field for ultimate receiver

materials selected, the production director and the briefer meet and discuss preparation of the complete script. The actual commentary for the script, which is prepared according to standard TV format, is written by the briefer with the help of the production director who may suggest changes in wording to enhance the presentation. Depending on the experience of the briefer and the nature of the material, an outline script rather than a full script may be prepared. In this, the narrative of the full script is replaced with key words, topics and reminder phrases.

4. *Rehearsal.* In this final area of production planning, all elements of production are brought together. Visuals are ready for camera. The script is complete and cleanly typed for the briefer. Camera action is plotted; lights, microphones and properties are arranged. The first rehearsal may be a "walk through." Slight revisions of organization may be made, and "rough" areas may receive added rehearsal. If time permits, a dress rehearsal may be desirable. The briefer is then ready to go "on the air."

The TV production planning guide places heavy emphasis on the importance of good visuals to an effective TV presentation, detailing specifications as to correct proportion, size and content. "Getting the right kind of visual materials, especially from inexperienced briefers, is sometimes a problem," said William R. Smith, civilian producer-director for the headquarters CCTV facility. "To be effective they should be bold, simple and direct; not finished and polished work, just clean, simple and bold. But we still receive what we call 'laundry list' copy. Our eventual goal is to have all offices prepare their own visuals to our tried and accepted standards."

He further pointed out that if briefers follow the steps in the planning guide, professional quality productions will result. However, in order to provide quick reaction, the television facility has, and practices, the capability of adapting whatever visuals the briefer may have, and doing the production on an immediate basis without benefit of rehearsals. While the quality may suffer slightly, the state-of-the-art and briefer acceptance advances with each usage.

TV As A Management Tool

The first official TV production milestone was accomplished by AFSC early this year when, by color television tape, the Commander of the Space Systems Division in

FIG. 13. William Smith, civilian producer, coaches officers in making presentations.

Inglewood, California, briefed the Commander of AFSC at a management conference in Washington, D.C.

The audience in Washington included General Schriever and members of his staff. Simultaneously in California, Major General Funk and his staff were viewing another copy of the secret tape. After the tapes were presented, questions were answered over the inter-headquarters secure telephone. The success of this first test of the CCTV management system has resulted in a steady increase in the number of high priority briefings. In the short, few months of AFSC CCTV operation, some 200 briefings and presentations have been made.

Air Force officials agree that the present system, although not truly "real time" in the national sense, is a direct means of governmental management communications and a significant step toward the goal of providing current information of the kind necessary for accurate decisions in literally a world of exploding technology. Experts

who have made studies of the complex Air Force management problem consider it to be the most comprehensive of all the known audio-visual techniques and one that may reduce the immense quantities of staff time and energy, as well as expense, that are consumed in technical, management and background V.I.P. briefings.

Major J. F. Sublette, Chief of the Telepresentations Branch of AFSC is one who foresees TV management surpassing all other uses of CCTV. In his words, "It is the only means we've got of reacting immediately to demands from those with one foot in the airplane. This condition will be alleviated by bringing the real-time approach to all our divisions and centers."

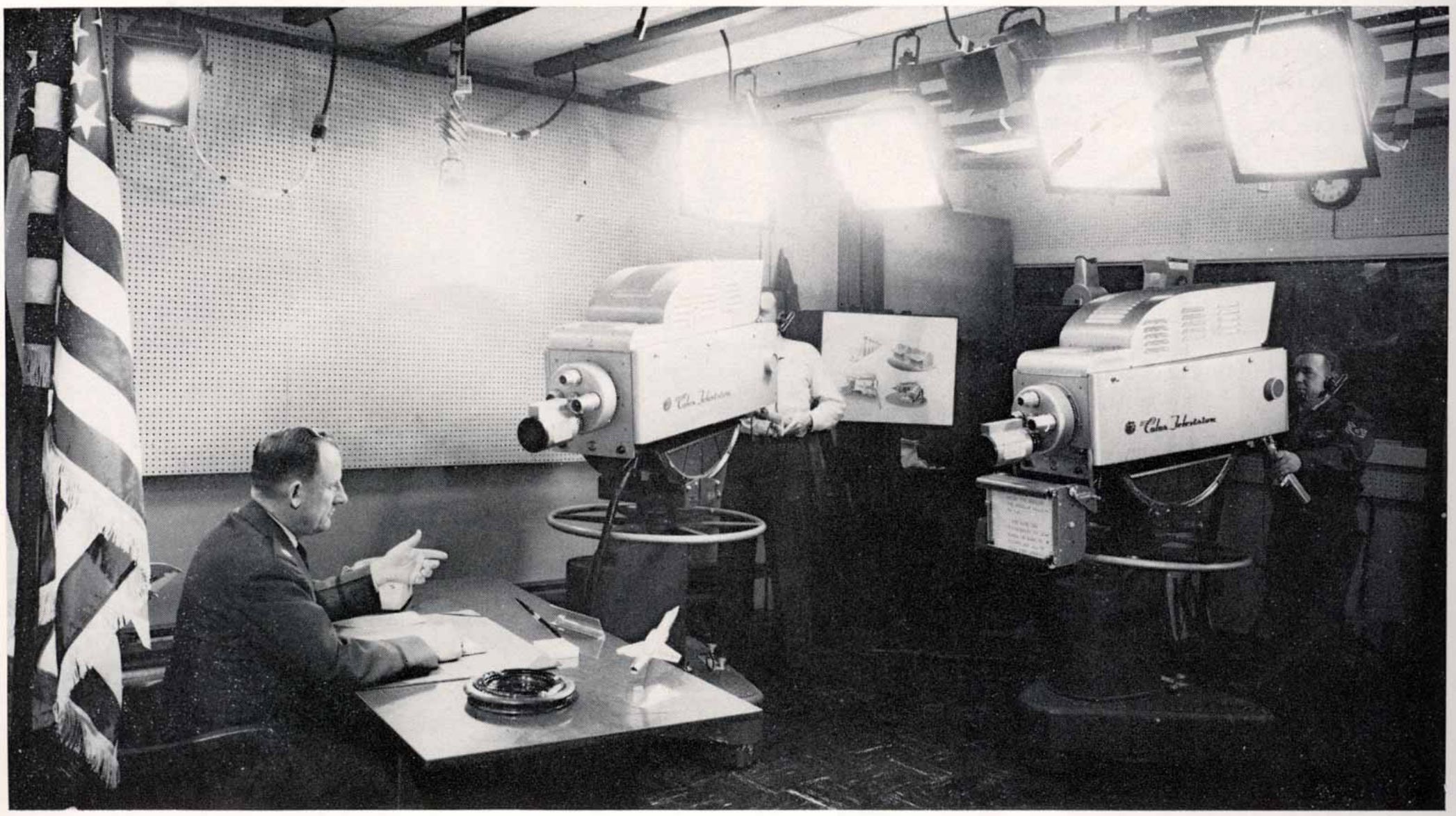
The Economics of Management TV

Major Sublette, whose extensive research and findings in the application of CCTV are contained in a thesis he prepared for Indiana University, is presently studying the economics of TV as used by the Systems Command. Some aspects of the difficult undertaking are presented in his comments:

"Where TV is used in education and training, economies brought about by mass communications alone are real, even measurable. We are looking for some such 'yardstick' for TV as a management tool.

FIG. 14. Slides, charts and other visuals are prepared in the graphics department.

FIG. 15. Col. Binge rehearsing a briefing in TV Studio at Andrews. Included are two Color TV Cameras, Type TK-41, for preparing tapes for television presentations.



"Undoubtedly, TV achieves savings in personnel time, in travel, in the number of trips, and in the costs of repeated briefings. This does not take into account the value of closer communication or of greater speed and accuracy in the decision making processes, or the increased effectiveness of presentations. But exactly how are these things measured?

"We do know that the ultimate result is better efficiency in communications, and in overall participation and decision making. The Air Force is growing, becoming more complex and dealing with more sophisticated systems. We must improve communications in order to keep ahead."

The Value of Color TV

Color was found to contribute significantly to preception and understanding, particularly in complex presentations. Charts and graphs, which play an important part in the visualization of problems, are more easily seen, understood and remembered when in color, and color is frequently used as a "key" to indicate important instructions and zoning. The color TV system also permits integration of available maps, slides and other materials that may be unusuable or totally ineffective if presented in monochrome.

Future Plans

CCTV space limitations at AFSC headquarters are becoming a problem as more of the associated offices call upon them for service. Plans are being made to enlarge the studio and other facilities.

AFSC's long range plans are to equip all the Command's divisions and centers with similar CCTV facilities to permit the production and viewing of TV briefings.

The most immediate goal, however, is to establish a completely secure microwave leg to the Pentagon. This system would permit AFSC to tie into the existing Air Force TV system at the Pentagon, and into a similar proposed system at the White House. This could be the first step in a nationwide, two-way TV network that would eventually link USAF headquarters and all AFSC divisions and centers.

Also envisioned is an Instant Management Data System at Systems Command headquarters. In this concept, all divisions and centers would enter current information in their respective computer or storage equipment. This data could then be forwarded electronically, upon request, to headquarters or to any receiving point having need for the information.

HOW CCTV IS USED BY AFSC

1. To serve as a management aid in presenting current information and data to the decision making staff level.
2. To serve as part of a video tape network between major air commands and Headquarters, USAF.
3. To serve as a production source and library for current and past briefings on TV tape.
4. To serve as an aid to administrative and training activities.
5. To serve as a means of enhancing briefings.
6. To serve as a method of extending the audience.
7. To serve as a centralized briefing facility using live and taped presentations.

FIG. 16. Equipment complement at Andrews includes transistorized TV Tape Recorder, Type TR-22, for producing color briefings.

Function of Patrick Air Force Base in Management TV

The functions of Air Force television at Patrick are, in part, unique, since the mission of the entire Air Force Missile Test Center is itself singular in the country. Several organizations are part of the Cape Kennedy team, and all of them have occasion to be aware of the value that television brings to modern communication.

The Air Force is the host at this gigantic rangehead and at the several downrange stations. Pan American is the prime contractor, charged with running and maintaining the range, and the Radio Corporation of America provides AMR instrumentation. Many other organizations contribute, obviously to the total effort, which is to serve the many range users who bring projects, missiles, tests and a myriad of other programs to the Missile Range for military and scientific research. The problems of management communication among these several types of organizations are accentuated on the AMR, and in meeting these problems, the Management Information Office (MIO) with its fixed and mobile television capabilities—has its prime mission.

Intra-mural briefings are continually being made, as management in the Air Force, PanAm, RCA, or a range user

FIG. 17. Mobile van makes it possible for Air Force to extend services of Management Information TV studio to scenes of actual launches.

FIG. 18. Mr. Gordon Fountain, Production Director makes a final check inside the van before a remote pickup.

agency goes about its business of handling, sorting, and analyzing technical or human data. Where a message is important to many people, a briefer can easily put his presentation on TV tape, after taking advantage of the consulting and graphics services within MIO. Once a tape is made, it can be shown at several locations, and it can be shown repeatedly. Thus, the briefer gives his message but once, and his audience, from that moment until the message is outdated, continues to grow.

Technical briefings, however, make up but a part of the television fare at Cape Kennedy. Documentaries are produced quite often, requiring the skills and talents of writers, producers, artists and the television crews. The prepared and rehearsed TV tapes are used within the Air Force across the country, in bringing to other Commands, other agencies within the Systems Command, and even the Air Staff itself, the ever changing story of the country's space effort and the details within it.

The Public Information Office has taken advantage of the television center at Patrick, and arrangements have been made for cooperation with network news departments so that signals recorded by the MIO

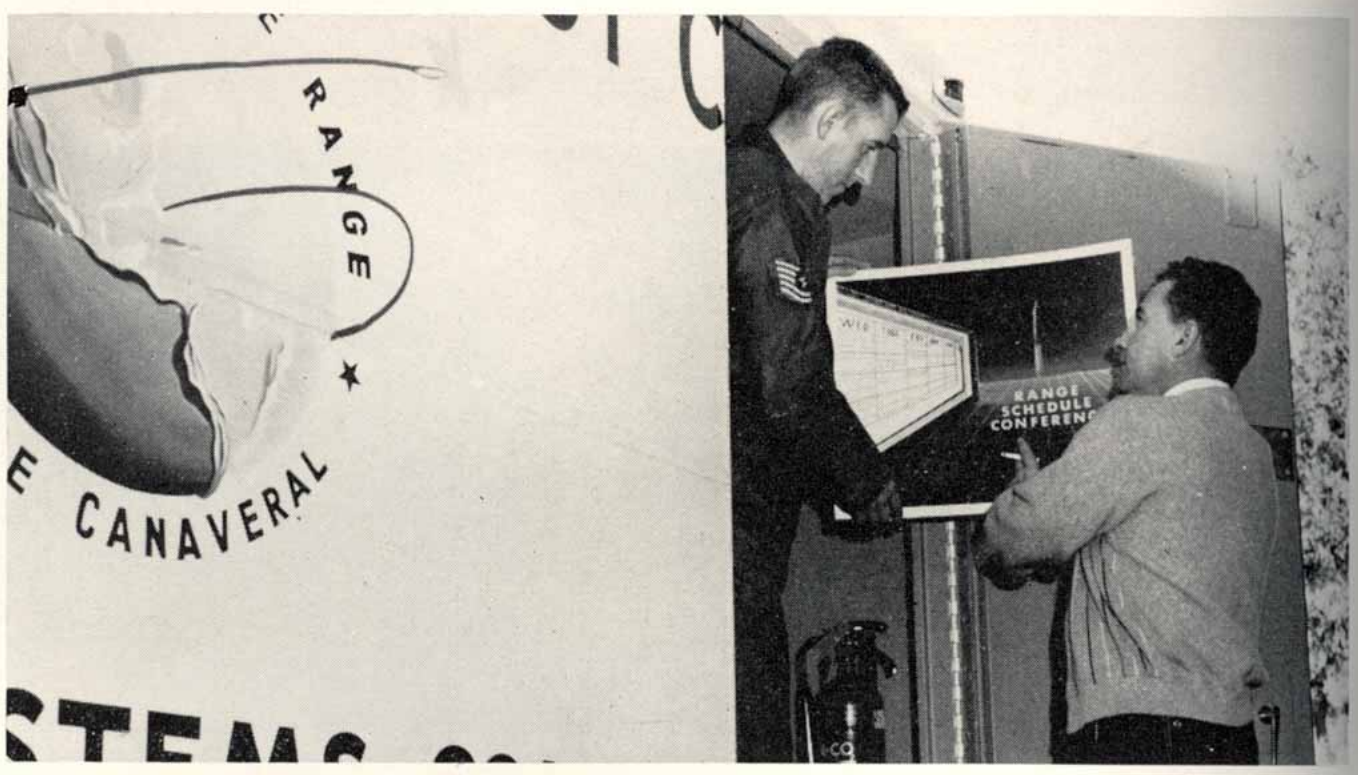


FIG. 19. A vital part of each production is preparation of visual material. T.S. G. R. Zambs checks flip card with staff illustrator, R. M. Rubin, before live pickup.

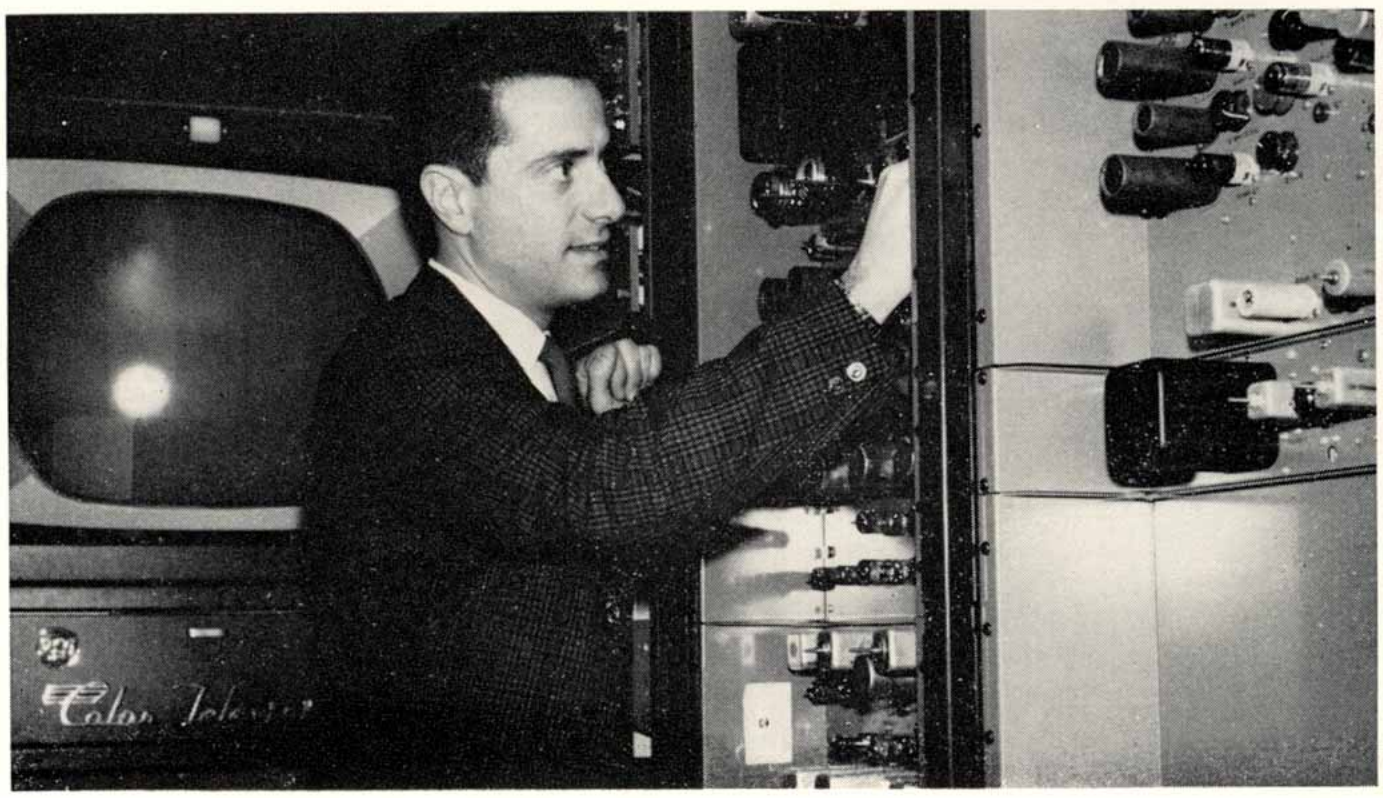


FIG. 20. Dr. Frederick Breitenfeld, Jr. Director of Missile Test Center's Management Information Office. He supervises the TV operation and acts as consultant on matters pertaining to presentations.

can be shipped—or even fed electronically—to news media, with striking speed. The Cape Kennedy story, then, is carried to the people, through a magnificent combination of efforts and talents. Tapes are made of all important launchings, both for public release and for use in solving the problems of launch operations.

The Management Information Office makes continual use of televisual communication in management, public relations and handling of technical data.

▲ FIG. 21. Studio Control Room at Patrick. Cameras are switched here and films are integrated in TV Tape presentations. Note, at far right, window looking into TV studio.

◀ FIG. 22. Color TV Studio at Patrick Air Force Base, Florida.

▼ FIG. 23. Television tape and film systems installation at Patrick.

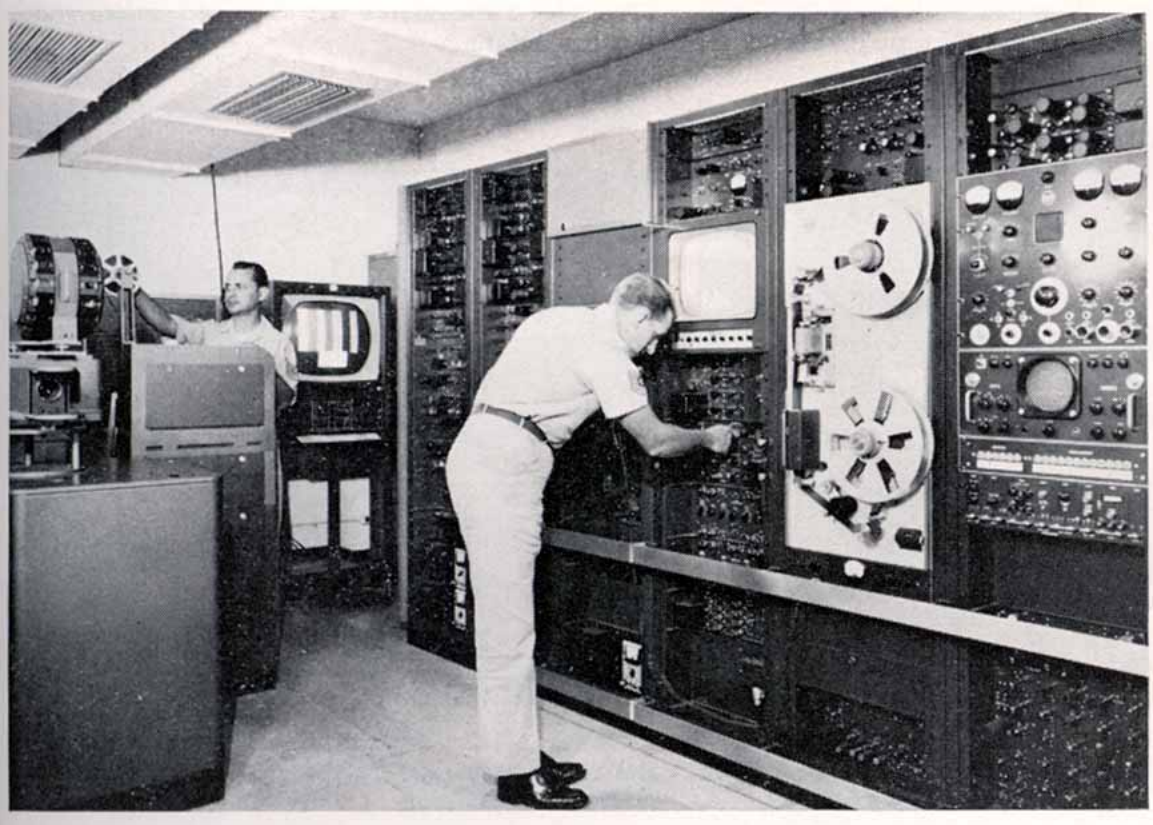
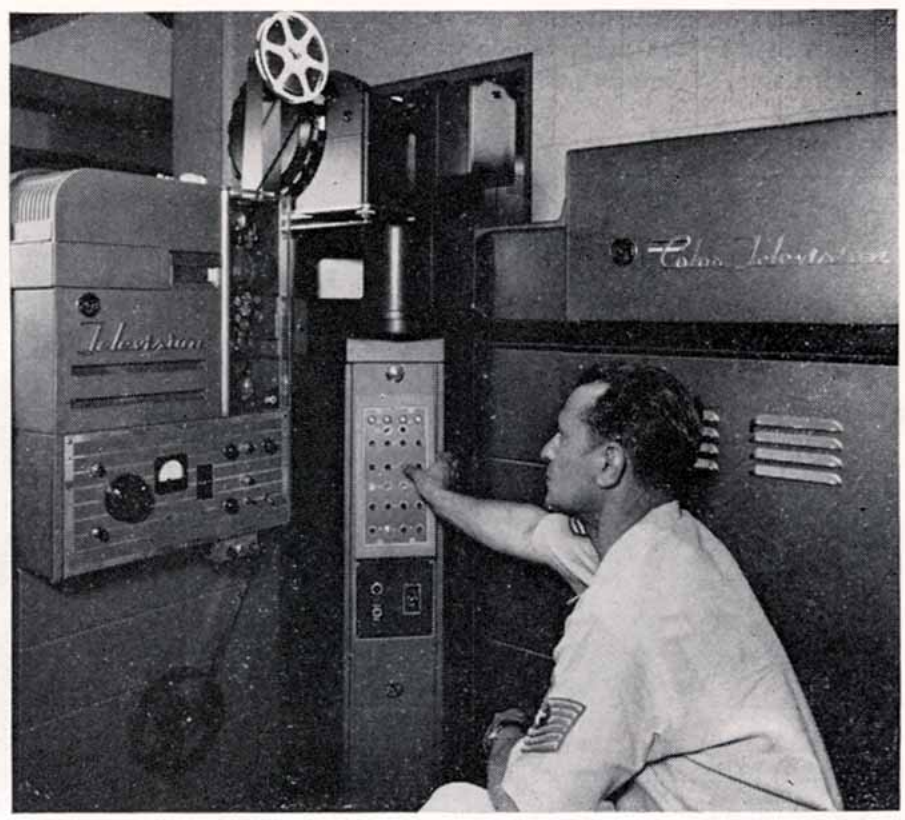


FIG. 24. Film System may be controlled locally (as shown here) or remotely from the studio control. ▼



Closed Circuit Color TV is a Management Tool At Space Systems Division

Recently an SSD officer had to be in two places at once. His schedule called for delivering an important briefing at the same time that urgent orders came for him to catch a plane to Washington.

The solution to his problem was the SSD closed circuit color TV system—latest management communications tool set up to facilitate exchange of information about the Division's space projects.

"Because of his priority we juggled the schedule and had him on camera in 15 minutes," Ken Whitman, Prod/Tech manager of the CC-TV system, said. "This officer knew his subject and we used his visual aids just as they existed.

"It usually takes about 10 minutes to explain the simple techniques we use. After that the briefer gives his report in his own manner."

Conferences Taped

Tapes of important AFSC conferences have been assembled into a library available for instant showing. They can be replayed at any time, updated when necessary, or erased when not needed.

TV tapes are time savers. A briefing officer can be certain that the same information is presented in the same manner each time. If any question arises as to what was said and in what context, the video tape gives the answer.

These tapes can be shown locally in secure playback areas accommodating 5 to 50 people. Copies can be sent by pouch to AFSC or to other areas. The briefing officer can accompany the tape or handle questions by telephone.

"If an officer comes prepared to speak and has his visual aids in order, we can work in 'real time', doing all our taping as he goes through his regular briefing. By speaking once, he is free to do other work

FIG. 25. Col. Richard E. Sims checks in with receptionist as the first step in making a closed circuit color TV briefing tape.

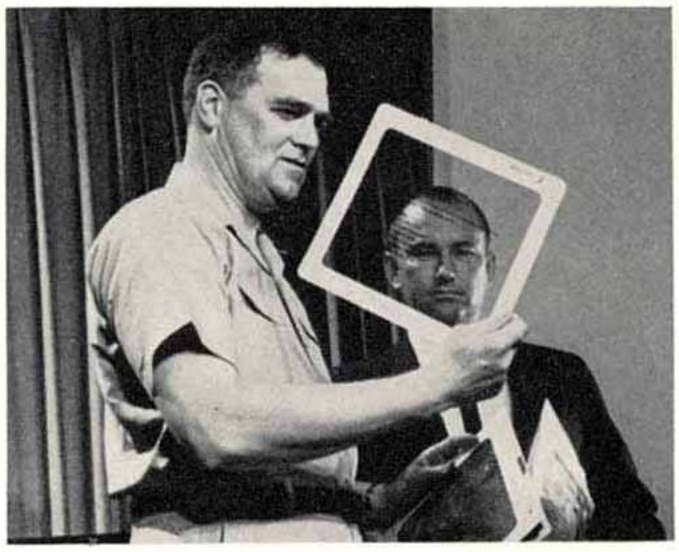


FIG. 26. Next step is to check visual aids. These aids will be integrated in the TV tape presentation.

FIG. 27. TV cameras are adjusted before shooting the briefing.

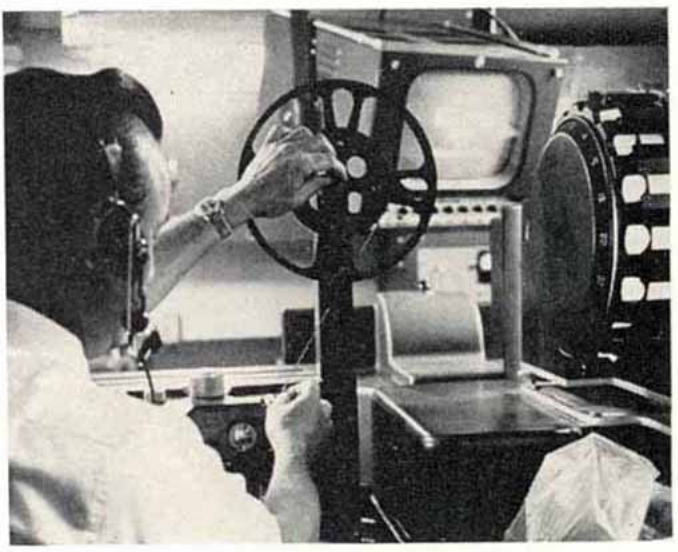


FIG. 28. Projectors are readied for inserting film clips and slides into the TV briefing.

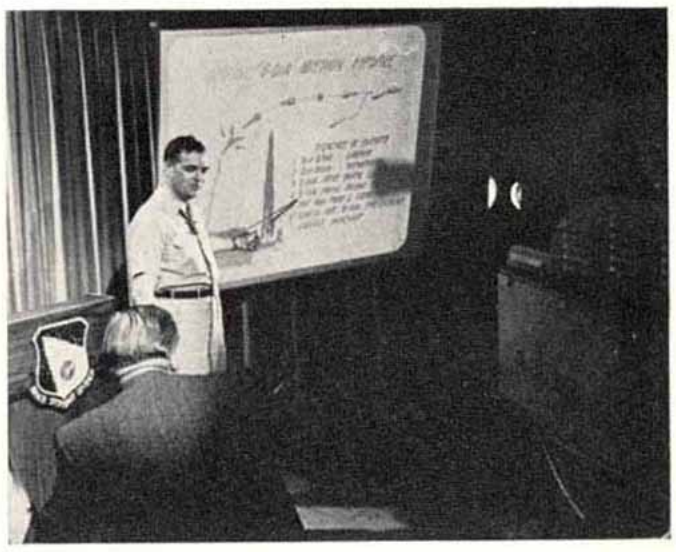


FIG. 29. Shooting begins . . . this single briefing on TV tape can be repeated numerous times —frequently accomplishing the job better.

FIG. 30. Views from the three cameras show on the monitor screens as the briefing goes on tape for future showings.

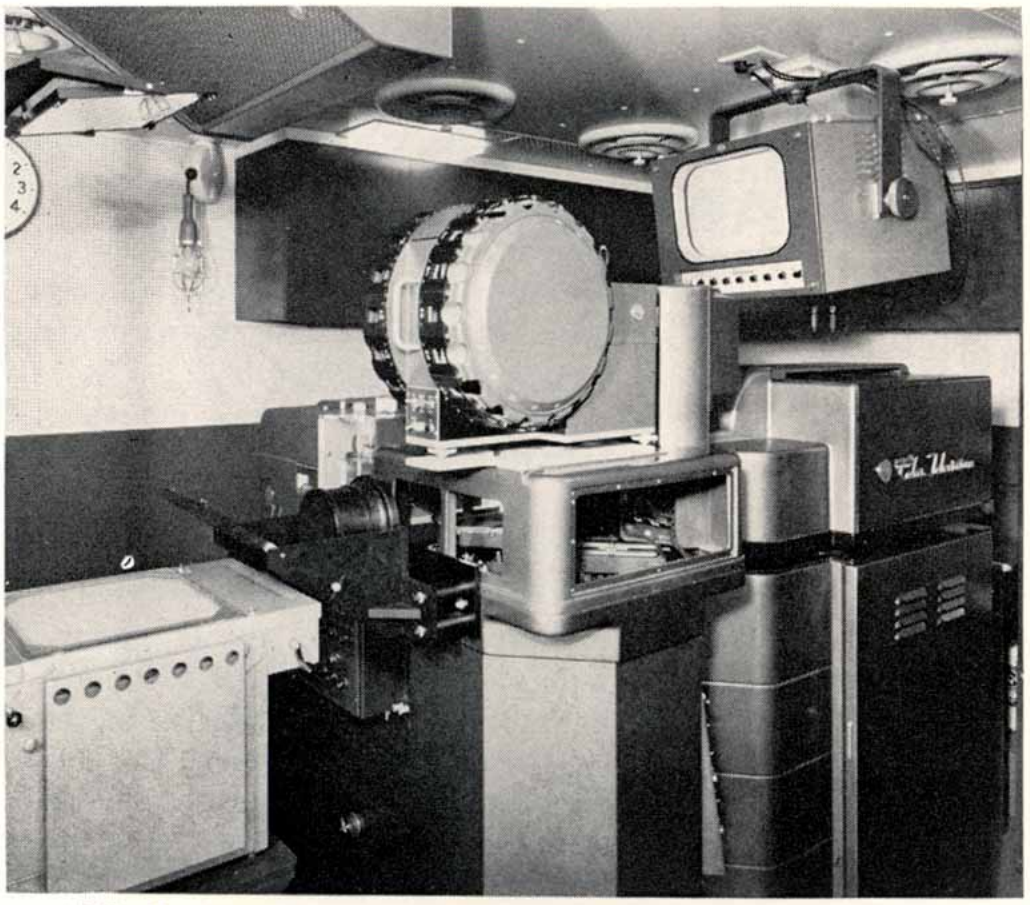


FIG. 31. Tele-Cine area of S.S.D. mobile van includes color film chain with slide, film, and overhead transparency projectors.

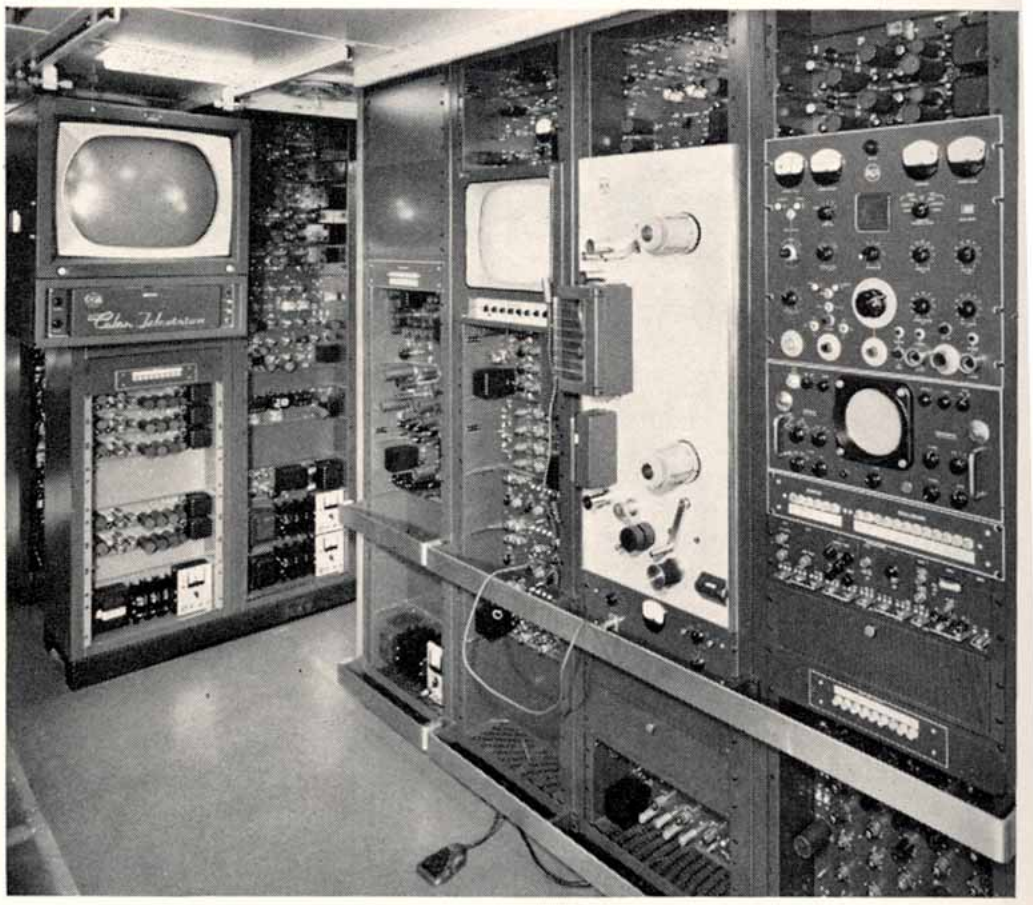


FIG. 32. TV tape area in S.S.D. color mobile van.

while his color image and voice work for him at hundreds of other showings," Whitman said.

Experienced Craftsmen

Briefings are done by acquainting the officer with simple television presentation procedures and by employing professional TV cameramen who are experienced in following the action.

On a low priority basis tapes will be made for speakers who simply want to study their own delivery.

In addition to technical briefings, other types of material are taped to aid directorates. Recently, a briefing was made for the transportation office to free personnel from repetitive explanations about household goods shipments to transferees.

The television section is a highly professional group. Many of the personnel are veterans in the communications business and in the television industry. Some are recognized authorities in their specialties.

Value of the TV tape is shown by the remark of an industry representative who said that he walked out on a live briefing. "I couldn't see the charts from the ninth row, but when I saw it replayed on TV it was just like I was an audience of one."

It was explained that this is because the TV camera can zoom down to show chart detail.

Results of the use of television for management decisions and for briefings have been gratifying. Time and money have been saved and people have been welded closer together.

FIG. 33. Operations area of mobile van, showing relationship of camera controls and monitors to the control desk.

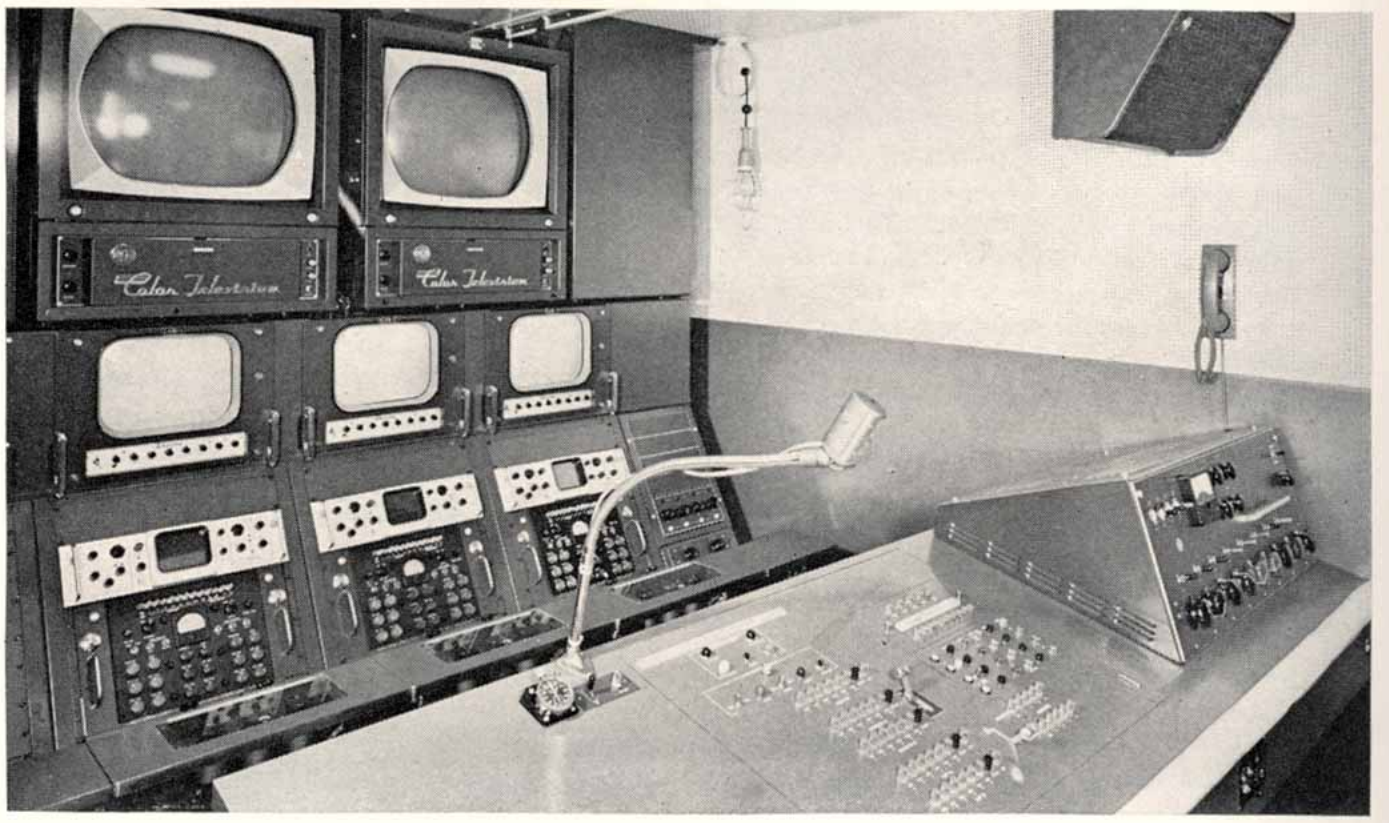


FIG. 34. External view of S.S.D. color mobile van. It is 50 ft. long by 10 ft. wide and contains all facilities for making Color TV Tapes in the field.